

a little tremulous, the wavy surface appeared to touch the limb of the planet at times, and the time given of internal contact is when the continuity of the limb was first permanently broken and was considered very exact; there was nothing approaching the phenomenon of the black drop, nor was the planet at all distorted, though the slight boiling motion might (for the shortest possible moment) give one the idea of a fine line or hair joining the two bodies, but nothing definite or decided was seen. The planet was not in the faintest degree visible after passing off the Sun's disk. No sunspots were seen.

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*Meteor Showers derived from Foreign Observations: July to December.* By W. F. Denning, Esq.

The showers given in the Table which follows were selected from a large number of such positions resulting from the projection of several thousand meteor-paths in the Catalogues of Heis, Weiss,<sup>†</sup> Schiaparelli (1872), Zezioli, and Konkoly. They occur during the last half of the year and afford examples of well defined and active radiants, many of which will no doubt be frequently reobserved in future years. The list includes 79 of these meteor-streams, and 1,874 shooting stars were found conformable to them, giving an average of nearly 24 for each centre. The periods assigned are merely approximate. They relate simply to the dates for which the reductions were undertaken and afford no clue to the whole duration of many of the showers. Any extended references here to these newly ascertained centres are rendered unnecessary by the column of Notes affixed to them, in which many agreements and comparisons with old showers are specified; but in a few cases it seems desirable to add some particulars to what is already mentioned in the Table. The first group of reductions are for July 25–31, when the *Perseids* (No. 4) formed the most active shower and there were good contemporary radiants near  $\theta$  *Persei* (No. 5) and  $\beta$  *Persei* (No. 3). The major shower of *Perseids* (near  $\eta$  *Persei*, showing a strong maximum on August 10) appears to continue certainly until the middle of September from precisely the same diverging focus as in July (compare Nos. 4 and 30 in the list). July also furnishes a good radiant close to  $\psi$  *Cassiopeiæ* which is well confirmed by Greg and Herschel and Heis, and further supported by a first magnitude stationary meteor observed by Billerbeck, at Rastenburg, on July 28, 1851, at  $12^{\circ} + 76^{\circ}$ , though the position is rather too far north. For August 6–12 there are some extremely well marked showers eastwards of the usual *Perseids*, several of which were already discovered by Heis in the years 1833–75, or by myself during a

number of morning observations in August 1877. The most noteworthy of these is a shower in *Camelopardus* (No. 14), near the stars *p*, *q* (of Bode), that had hitherto escaped discovery, though it is a rich and well defined radiant, which I have already referred to in the *Notices* (vol. xxxviii., p. 114), with maximum probably on about August 10. Another important system for the same epoch is given at *c Camelopardi* (No. 12), but this had already been seen by Heis and was independently found by me on the mornings of August 10-12, 1877. Mr. J. E. Clark, at York, also suspected a radiant here on August 10, 1871. The shower at  $132^{\circ} + 77^{\circ}$  (Nos. 10 and 21, July 25—August 12) appears to be a new position, and it is worthy of note that it falls exactly in the place of a strong October radiant. No. 22, at  $74^{\circ} + 33^{\circ}$ , is not quite certain as regards the exact point of radiation, which I suspect is a little further west, at  $77^{\circ} + 32^{\circ}$ . No. 33 is a prominent September shower well seen by me in 1877, September 4-15 A.M., at  $61^{\circ} + 36^{\circ}$  ( $15^{\circ}$  ↓), and it agrees with two old positions determined by Schiaparelli (from Zezioli's observations) and Tupman, namely :—

S. & Z.	No. 147	Sept. 8	$60^{\circ} + 32^{\circ}$	} Mean at $63^{\circ} + 36^{\circ}$ .
T.	No. 64	Sept. 7-15	$66^{\circ} + 40^{\circ}$	

Of the autumnal showers the *Orionids* (No. 47), *Taurids* I (No. 41), and *Gemellids* (No. 40) of October supply the chief examples, but these have already been well investigated by Greg. It may, however, be said of the *Orionids* that they certainly continue until November 12, for a very exact radiant, coinciding with that shower, is shown there from the meteor-paths traced by Zezioli (see No. 70). As to the *Taurids* I (No. 41), the whole duration of the major radiant would seem to be from about October 12 to the first week in December; but there are several showers lying near together here, which it is necessary to disassociate. With this object in view I recently collected and compared all the observations of this system and found that, from 38 different determinations, there are probably *four* bordering showers of *Taurids* in October—November, as follows :—

I	At $62^{\circ} + 21^{\circ}$	Oct. 12—Dec. 6	21 radiants.
II	At $56^{\circ} + 24^{\circ}$	Nov. 1-13	6 radiants.
III	At $53^{\circ} + 16^{\circ}$	Oct. 6—Nov. 9	6 radiants.
IV	At $60^{\circ} + 9^{\circ}$	Oct. 10-22	5 radiants.

I is the major radiant with a sharply defined, persistent centre enduring apparently for 7 weeks. II is at the *Pleiades* (see No. 54 in the Table) and well observed by Greg and Herschel, Tupman, and myself, and at Greenwich. III appears equally certain. It was noted by Tupman in 1869 and by Backhouse in the same year. IV requires more observations, but

Schmidt's radiant at  $62^{\circ}+6^{\circ}$ , October 10-22, and Tupman's, at  $58^{\circ}+10^{\circ}$ , October 13, are perhaps sufficient to establish it beyond doubt, and its continuation in November is extremely probable, for Heis, at Munster, recorded a stationary meteor on November 13, 1869, at  $58^{\circ}+12^{\circ}$ , and 38 other shooting stars converged on the same centre during the first half of the month.

These several showers of *Taurids* should be carefully reobserved and the distinctive features of the meteors proceeding from them noted in each case. In the mornings of October—November the *Gemellids* (No. 40) also constitute a prominent shower. Gruber, from his October 17-28 reductions, places the centre at  $109^{\circ}5'+25^{\circ}2'$ , October 22-27, and Schiaparelli and Zezioli,  $113^{\circ}+29^{\circ}$ , for October 21-25, 1868 (56 meteors). This radiant was traced, as far back as 1839, by Herrick. Of the remaining October showers the most conspicuous examples are at  $62^{\circ}+47^{\circ}$  (No. 45),  $81^{\circ}+23^{\circ}$  (No. 35),  $81^{\circ}+54^{\circ}$  (No. 34, *Aurigids*), and  $86^{\circ}+34^{\circ}$  (No. 50). The former was chiefly deduced from the meteors in Weiss's catalogue and is verified by several other observations. No. 35 agrees in position with the *Taurids* II (No. 72), but the dates are too widely distant to allow an inference of connection. No. 34 is one of several contemporary showers of *Aurigids*. No. 50 was strikingly well seen by Zezioli on October 21, 1868 ( $17^{\text{h}}4^{\text{s}}$ ), and this position, close to  $\theta$  *Aurigæ*, is otherwise well supported as a prominent shower centre and separate from No. 39 at  $78^{\circ}+33^{\circ}$ . For the first half of November the Table contains several good instances of morning showers, now satisfactorily determined for the first time. There is a rich stream at  $142^{\circ}+29^{\circ}$ , near  $\kappa$ - $\mu$  *Leonis* (No. 61), accurately indicated by 31 paths and quite distinct to the *Leonids*. Schmidt saw this radiant at  $140^{\circ}+23^{\circ}$  on October 19-27 and on the mornings of October 15-18, 1877, I traced a shower of swift, streak-leaving meteors (one of them stationary) from an exact centre at  $140^{\circ}+28^{\circ}$ . The members of this stream have no doubt been confused hitherto with the *Leonids*, for the positions are close together and the phenomenon of streaks is a characteristic of the members of both systems. Schmidt's position for the new shower is about  $5^{\circ}$  too far south of the true centre, and it is rather remarkable that for December 9-12 there is also a good radiant at  $143^{\circ}+28^{\circ}$ , which, agreeing so closely in place, seems merely a continuation of it. The other November showers given in the list are also very satisfactory and confirmed in nearly every case by Zezioli, Tupman, or myself during numerous morning watches in that month.

The *Taurids* II (No. 72) of December, with a strong maximum on about the 6th, had long escaped observation, appearing as they did at a time when the *Geminids* occupied attention, and there is little doubt that many of these *Taurids* were attributed to the wrong stream. A stationary meteor belonging to it was recorded by Bartel, at Brünn, on December 11, 1869, at  $82^{\circ}9'+22^{\circ}9'$ , and this position, close to  $\zeta$  *Tauri*, has been amply

confirmed by Greg and others. The shower in *Camelopardus* (No. 79), at  $110^{\circ}+70^{\circ}$ , is a new one, but we require further observations before it can be safely regarded as established beyond doubt. The December showers, Nos. 73 to 77, in *Cancer*, *Leo*, and *Ursa*, agree very exactly with showers deduced for November (compare Nos. 62, 58, 63, 61, and 57); in fact it would seem, from a careful inspection of the observations, that these several radiant centres are in continuous operation from the middle of October to the middle of December! Yet such long duration is inadmissible on theoretical grounds, and to obviate the difficulty we have to assume a succession of distinct showers having, curiously enough, the same points of departure though no real connection exists between them. Whether the effects of planetary perturbations on these attenuated meteor streams is such as to diffuse them over a considerable epoch without sensibly altering the radiant points has yet to be ascertained; meanwhile observers will state the legitimate result of their labours apart from theoretical considerations, however incompatible they may at first appear.

*A Synopsis of Old and New Meteor Showers (occurring during the last half of the year), derived from the Meteor Paths recorded in the Catalogues of Heis, Weiss, Zezioli, Schiaparelli, and Konkoly.*

Ref. No.	Period of Shower.	Radiant Point. R.A. Dec.	No. of ↓s	Observer or Authority.	Name of Shower or Approximate Star (Bode).	Remarks and Comparisons with previous Observations.
1	July 25-31 and Aug. 13	15 + 70	35	H.W.Z. & K.	ψ Cassiopeia	12 + 70, July 7-Aug. 4, G. & H.; 15 + 70, July 28-29, H. Well seen in 1878, at 12 + 70, July 26-Aug. 2 (16 ↓s), D. See No. 56.
2	July 25-31	67 + 66	14	H.W.Z. & K.	ε Camelopardi	Beginning of No. 12; requires verification.
3	July 25-31 and Aug. 13	41 + 40	28	H.W.Z. & K.	β Persei	38 + 38, July 31, 1856, Heis (stationary meteor). See No. 45.
4	July 25-31	45 + 57	31	H.W.Z. & K.	Perseids	Early members of the great August shower, with max. on 10th. See No. 30. Very few seen before Aug. 7, 1878, D.
5	July 25-31 and Aug. 13	32 + 51	35	H.W.Z. & K.	θ Persei	37 + 48, July 19-Aug. 2, H.; 35 + 47, July, D. See No. 44. A very fine shower (63 ↓s) July 21-Aug. 1, 1878, at 32 + 53; maximum, July 30-Aug. 1, D.
6	July 25-31	23 + 41	15	H.W.Z. & K.	γ Andromedæ	New shower. 23 + 41, July 29-Aug. 1, 1878, D. Compare with No. 32.
7	July 25-31	25 + 57	23	H.W.Z. & K.	♄ Cassiopeids	Radiant diffuse and uncertain. 24 + 50, July 19-31, H.
8	July 25-31	13 + 52	18	H.W.Z. & K.	♄ Cassiopeids	7 + 50, July, S. & Z.; 6 + 53, July, D. Seen also by Italian observers, 1872. 12 + 52, July 21-Aug. 1, 1878, D.
9	July 25-31	48 + 73	14	H.W.Z. & K.	♄ Custos	Beginning of No. 16. } These several showers require more
10	July 25-31	130 + 77	11	H.W.Z. & K.	29 Ursæ Majoris	Beginning of No. 21. } observation in July. They are al-
11	July 25-31	63 + 50	10	H.W.Z. & K.	μ Persei	Beginning of No. 15. } ready well established for Aug. 6-12.
12	Aug. 6-12	70 + 64	74	S.H.W. & K.	ε Camelopardi	70 + 65, Aug. 10-12, 1877, D.; 73 + 63, Aug., H.

13	Aug. 6-12	61+39	59	S.H.W. & K.	ε Persei	64+39, Aug. 11-19, H.; 61+43, Aug. 10, Parniseti. See No. 49.
14	Aug. 6-13	96+71	106	S.H.W. & K.	p, q Camelopardi	A new and rich shower; the chief rad. E. of <i>Persæus</i> , Aug. 6-12. Slightly seen by D., July 30-Aug. 1, 1878. Meteors rather slow.
15	Aug. 6-12	61+48	59	S.H.W. & K.	μ Persei	61+48, Aug. 3-16, 1877, D.; 56+47, Aug. 3-11, Schmidt. See No. 45. The fireball of Aug. 11, 1876, had a radiant at 60+51 (A.S.H.).
16	Aug. 6-12	51+74	62	S.H.W. & K.	Custos	51+75, Aug. 6-12, H.; 50+75, Sept., G. & H. Compare No. 29. Seen also by D., July 26-31, 1878, at same point.
17	Aug. 6-12	78+56	59	S.H.W. & K.	δ Aurigæ	77+54, Aug. 11, 69, W.; early <i>Aurigidæ</i> . See No. 34. Stationary meteor seen by D. at 77+54, July 20, 1878.
18	Aug. 6-12	76+45	43	S.H.W. & K.	α Aurigæ	75+45, Aug. 29, 1870, T. Well defined radiant; 3 meteors stationary.
19	Aug. 6-12	50+47	42	S.H.W. & K.	α Persei	50+48, Aug. 3-12, Schmidt; 48+48, Aug. 6, 1869, T.
20	Aug. 6-12	92+57	42	S.H.W. & K.	δ Aurigæ	94+62, Aug., G. & H. Requires more observations.
21	Aug. 6-12	134+77	30	S.H.W. & K.	29 Ursæ Majoris	New shower. ? beginning of Heis's N <sub>1</sub> s, 130+84, Sept. Supported by 2 meteors, almost stationary, in July, on 21st, 1878, D.; and 26th, Strasser. See No. 10.
22	Aug. 6-12	74+33	28	S.H.W. & K.	φ Aurigæ	70+31, Aug. 29, 1870, T.; 70+32, Sept., Schmidt. See No. 39.
23	Aug. 6-12	104+34	13	S.H.W. & K.	θ Geminorum	110+32, Aug. 20-25, 1871, T. (suspected). Visible just before sunrise.
24	Aug. 6-12	99+45	17	S.H.W. & K.	Telescopium	A new radiant; distinct from the preceding. See No. 38.
25	Aug. 6-12	45+33	18	S.H.W. & K.	Musca	41+34, Aug. 10, S.; and Aug. 4, T. See No. 48.
26	Aug. 6-12	76+74	20	S.H.W. & K.	Camelopardus	Perhaps connected with No. 14; requires confirmation.

Ref. No.	Period of Shower.	Radiant Point. R.A. Dec.	No. of ↓s	Observer or Authority.	Name of Shower or Approximate Star (Bode).	Remarks and Comparisons with previous Observations.
27	Aug. 6-12	52+20	14	S.H.W. & K.	$\eta$ Tauri	50+20, Aug.-Sept., 1871, Corder; 48+19, Aug. 10, Denza.
28	Aug. 6-12	87+34	14	S.H.W. & K.	$\theta$ Aurigæ	A new Aug. shower; requires more observations. See No. 50.
29	Aug. 13	59+70	10	H.W.K. & Z.	Camelopardus	Probably the same as No. 16. 59+70, Aug. 8-12, H.
30	Aug. 24-Sept. 14	45+57	23	Z. & S.	Perseids	Late members of the August shower; radiant well defined.
31	Sept. 5-12	335+47	9	Z.	Lacertids	334+48, Aug. 23, 1870, T.; same rad. as July-Aug. <i>Lacertids</i> .
32	Sept. 5-12	22+45	13	Z.	$\gamma$ Andromedæ	25+46, Aug.-Sept., 1877, D.; requires more observations.
33	Sept. 5-12	60+37	9	Z.	$\epsilon$ Persei	No. 13 continued. A very good shower; seen by Z., T., & D.
34	Sept. 5-Nov. 12	81+54	29	Z. & W.	$\delta$ Aurigæ	A long enduring shower, with diffused rad.; also Dec. 9-12, 80+50 (28 ↓s), D. and others.
35	Sept. 5-12 and Oct. 12-31	81+23	30	Z. & W.	$\zeta$ Tauri	84+21, S. & Z., Oct. 13-21; perhaps two showers close together here? Active shower, 78+23, Sept. 8-10, 1869, T. See No. 72.
36	Sept. 8-Oct.	155+41	13	Z.	$\mu$ Ursæ Majoris	154.5+41.5, Sept. 15-Oct. 18, 1877, D.; a good A.M. shower.
37	Oct. 12-13	5+53	9	Z.	$\zeta$ Cassiopeiæ	5+53, Oct. 22-28, Schmidt; 5+55, October, G. & H.
38	Oct. 12-Nov. 7	98+44	20	Z.	Telescopium	98+45, Nov. 1877, D.; also at 105+52, in October.
39	Oct. 12-31	78+33	14	Z. & W.	$\phi$ Aurigæ	Sharply defined and exact; seen also by T., Oct. 13, 1869, and D., Oct. 8, 1877.
40	Oct. 12-Nov. 12	108+24	50	Z. & W.	Gemellids	Rich shower seen by many observers; 105+27 (G., 1876).
41	Oct. 12-Nov. 12	62+21	65	Z. & W.	Taurids I.	62+21, fireball of Nov. 23, 1877, T. A long enduring, rich, and well defined shower. N. of $\alpha$ Tauri.
42	Oct. 20-31	40+21	18	W.	$\epsilon$ Arietis	43+22, Oct. 31-Nov. 1, 1877 (13 ↓s), D.; distinct from No. 48 <i>Muscids</i> .

43	Oct. 20-31	25 + 44	12	W.	$\gamma$ Andromedæ	24 + 42, Oct. 17-31, 83 meteors, H. See No. 32.
44	Oct. 20-31	34 + 52	12	W.	$\theta$ Persei	32 + 50, Oct. 8, 1877, D.; exact and certain shower; meteors slow.
45	Oct. 20-31	62 + 47	31	Z. & W.	$\mu$ Persei	Strong radiant; seen at same point by D. (1877) and Italians (1872).
46	Oct. 20-31	40 + 40	22	W.	$\beta$ Persei	37 + 38, Oct. 17-31, II. Compare with No. 3.
47	Oct. 20-31	92 + 18	64	Z. & W.	Orionids	Rich shower with strong max., Oct. 18-20. See No. 70.
48	Oct. 20-Nov. 7	42 + 31	24	Z. & W.	Muscids	39 + 30, Oct. 19, Gruber; 46 + 35, Aug. 22-Oct. 20, Greg.
49	Oct. 20-Nov. 12	62 + 37	21	Z. & W.	$\epsilon$ Persei	62 + 37, Oct.-Nov., Italian observations, 1872; 62 + 37, fire-ball, Nov. 6, 1869. (A.S.H.)
50	Oct. 21— Nov. 9-12	86 + 34	26	Z.	$\theta$ Aurigæ	Strong shower, Oct. 21, 1868 (Z.); 86 + 36, Nov. 7-10, 1876, Corder.
51	Oct. 19-27	300 + 55	10	W.	$\psi$ Cygni	307 + 53, Nov. 1-13, Schmidt; not quite certain. A shower of bright meteors at 306 + 54 also on Sept. 1, D. and others.
52	Nov.	173 + 12	10	W.	$\beta$ Leonis	A new radiant visible just before sunrise; requires further obs.
53	Nov. 1-7	120 + 40	9	Z.	Telescopium	125 + 40, Nov. 12, 1877, D.; exact and certain.
54	Nov. 1-7	56 + 23	11	Z.	$\eta$ Tauri	56 + 24, Nov. 1-10, G. & H. & T. Distinct from <i>Taurids</i> I. (41).
55	Nov. 1-7	110 + 61	9	Z.	$h$ Lynceis	Not certainly established. 111 + 65, Nov. 30, 1867, Z.
56	Nov. 1-7	15 + 74	7	Z.	$f$ Cassiopeiæ	11 + 70, Oct. 8-14, 1877, D.; requires further watching.
57	Nov. 1-15	133 + 48	26	Z.W. & T.	$\iota, \kappa$ Ursæ Majoris	130 + 48, Oct. 21, S. & Z.; a well known shower; seen by many observers.
58	Nov. 1-15	149 + 38	23	Z.W. & T.	$\lambda, \mu$ Ursæ Majoris	142 + 36, Nov. 10-Dec. 9, S. & Z.; radiant not well defined.
59	Nov. 1-15	130 + 31	15	Z.W. & T.	$\rho$ Cancri	133 + 31, Oct. 28-Nov. 13, 1877, D.; seen also by Schmidt in December.

Ref. No.	Period of Shower.	Radiant Point. R.A. Dec.	No. of ↓s	Observer or Authority.	Name of Shower or Approximate Star (Bode).	Remarks and Comparisons with previous Observations.
60	Nov. 1-15	147 + 22	26	Z.W. & T.	Leonids	A few stray members of the great periodical shower.
61	Nov. 1-15	142 + 29	31	Z.W. & T.	$\kappa$ Leonis	140 + 28, Oct. 15-18, 1877, D.; Schmidt also 140 + 23, Oct. 19-27. See No. 76.
62	Nov. 1-15	132 + 20	17	Z.W. & T.	$\delta$ Cancri	133 + 21, Oct. 15-18, 1877, D.; a well marked shower. See No. 73.
63	Nov. 1-15	122 + 14	13	Z.W. & T.	$\zeta$ Cancri	120 + 15, Oct. 15-18, 1877, D.; radiant sharply defined. A shower here also on Sept. 25, 1878, D. See No. 75.
64	Nov. 1-15	144 + 52	14	Z.W. & T.	$\theta$ Ursæ Majoris	A shower also strongly suspected at 145 + 43.
65	Nov. 1-15	120 + 23	16	Z.W. & T.	$\mu$ Cancri	Possibly a new radiant; requires further investigation.
66	Nov. 1-15	175 + 32	8	Z.W. & T.	Coma Berenices	178 + 34, Oct. 16-17, 1877, D.; new shower in Coma just before daybreak.
67	Nov. 1-15	134 + 8	12	Z.W. & T.	$\zeta$ Hydræ	134 + 6, December, G. & H.; radiant not very certain.
68	Nov. 1-15	142 + 17	8	Z.W. & T.	$\circ$ Leonis	146 + 16, December, Schmidt; requires further watching.
69	Nov. 1-15	140 + 62	13	Z.W. & T.	$\tau$ Ursæ Majoris	140 + 65, Nov. 8-Dec. 13, D.; stationary meteor seen by Billerbeck, 145 + 61, Nov. 13, 1852.
70	Nov. 9-12	94 + 18	8	Z.	Orionids	Compare with No. 47. Late members of the October periodical shower. Radiant sharply defined.
71	Dec. 7-13	200 + 67	9	W.	$\alpha$ Draconis	209 + 67, Nov. 25-Dec. 20, Corder, Denza, and D. A shower from this point also in Jan. and Feb.
72	Dec. 7-13	83 + 23	27	W.	Taurids II.	A marked shower seen by D., Corder, and Sawyer, and confirmed by Greg; maximum Dec. 6.
73	Dec. 9-12	133 + 19	10	W.Z. & H.	$\delta$ Cancri	Continuation of No. 62. Comet of 1680 $\delta$ , 133 + 22, Dec. 27. 129 + 19, Dec. 21, 1876, D.

74	Dec. 9-12	152+43	16	W.Z. & H.	$\lambda, \mu$ Ursæ Majoris	149+45, Dec. 9-13, S. & Z. Compare Nos. 36 and 58.
75	Dec. 9-12	120+15	11	W.Z. & H.	$\zeta$ Cancri	See No. 63. These three showers, with the two preceding, apparently begin early in October and endure until about the middle of December. Radiation is sustained from the same points.
76	Dec. 9-12	143+28	10	W.Z. & H.	$\chi$ Leonis	See No. 61.
77	Dec. 9-12	134+50	11	W.Z. & H.	$\iota-\kappa$ Ursæ Maj.	See No. 57.
78	Dec. 9-12	178+46	10	W.Z. & H.	$\chi$ Ursæ Maj.	180+53, Dec. 12, S. & Z. A well defined shower.
79	Jan. 6-Feb. 16	110+70	26	Z.S. & H.	Camelopardus	Seen chiefly by Zezioli, Jan. 28. Requires further proof.

The abbreviations are—H., Heis (Observations from 1833-75; W., Weiss (Austrian Observations, 1867-74); Z., Zezioli (Observations at Bergamo, in Italy, 1867-70); S., Schiaparelli (Italian Observations, 1872); K., Konkoly (Hungarian Observations, 1871-76); G. & H., Greg and Herschel (British Association Observations, 1850-74); T., Tupman (Observations in the Mediterranean, 1869-71); and D., Denning (Observations at Bristol, 1876-78).